

CLAIMS

1. 1. A magnesium based alloy containing

- i) at least 85.4 wt% Mg,
- ii) 4.7 to 7.3 wt% aluminum,
- iii) 0.17 to 0.60 wt% manganese,
- iv) 0.0 to 0.8 wt% zinc,
- v) 1.8 to 3.2 wt% calcium,
- vi) 0.3 to 2.2 wt% tin, and
- vii) 0.0 to 0.5 wt% strontium

2. An alloy according to claims 1, comprising up to 0.004 wt% iron, up to 0.001 wt% nickel, up to 0.003 wt% copper, or up to 0.03 wt% silicon.

3. An alloy according to claims 1 to 2, comprising up to 0.001 wt% beryllium.

4. An alloy according to any of claims 1 to 3 further comprising incidental impurities.

5. An alloy according to any of claims 1 to 3, which contains 5.9 to 7.2 wt% aluminum, 0.9 to 2.1 wt% tin, 2.1 to 3.1 wt% calcium, and 0.2 to 0.35 wt% manganese.

6. An alloy according to claim 1, comprising in their structure an Mg-Al solid solution or Mg-Al-Sn solid solution (as a) matrix, and

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an intermetallic compound chosen from Al_9Ca , $\text{Al}_2(\text{Ca},\text{Sr})$, Al_xMn_y , $\text{Al}_9(\text{Ca},\text{Sn})$, and $\text{Al}_2(\text{Ca},\text{Sn},\text{Sr})$, wherein said intermetallic compounds are located at grain boundaries of said matrices of Mg-Al solid solution or Mg-Al-Sn solid solution.

7. An alloy according to any of claims 1 to 6 having high tensile yield strength (TYS) and compressive yield strength (CYS) both at ambient temperature and at elevated temperatures up to 200°C.

8. An alloy according to any of claims 1 to 6 having high creep resistance both at ambient temperature and at temperatures elevated up to 200°C.

9. An alloy according to any of claims 1 to 8 exhibiting a marked response to ageing at 250°C, wherein tensile yield strength, compressive yield strength, and creep resistance increase.

10. An alloy according to any of claims 1 to 9, which is beryllium free.

11. An alloy according to any of claims 1 to 10, which exhibits tensile yield strength at ambient temperature higher than 170 Mpa and tensile yield strength at 175°C higher than 150 Mpa.

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12. An alloy according to any of claims 1 to 10, which exhibits minimum creep rate (MCR) less than 1.7×10^{-9} /s at 150°C under stress of 100 MPa.

13. An alloy according to any of claims 1 to 10, which exhibits minimum creep rate less than 4.9×10^{-9} /s at 200°C under stress of 55 MPa.

14. An alloy according to any of claims 1 to 10, which exhibits improvements of its strength in course of temperature ageing at 250°C for 1 hour.

15. An article which is a casting of a magnesium alloy of any of claims 1 to 14.

16. An article of claim 15, wherein the casting is chosen from the group consisting of high-pressure die-casting, sand casting, permanent mold casting, squeeze casting, semi-solid casting, thixocasting and thixomolding.

17. An article according to claim 15 which exhibits tensile yield strength at ambient temperature higher than 170 Mpa and tensile yield strength at 175°C higher than 150 Mpa.

18. An article according to claim 15 which exhibits minimum creep rate (MCR) less than 1.7×10^{-9} /s at 150°C under stress of 100 MPa.

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19. An article according to claim 15 which exhibits minimum creep rate less than $4.9 \times 10^{-9} / \text{s}$ at 200°C under stress of 55 MPa.
20. An article according to claim 15 which was subjected to temperature ageing at 250°C for 1 hour.

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